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Docket No.: 212224US0

COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313



ATTORNEYS AT LAW

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RE: Application Serial No.: 09/923,358  
Applicants: Yoshiyuki KUMAZAWA, et al.  
Filing Date: August 8, 2001  
For: CHEESE YIELD ENHANCING METHOD  
Group Art Unit: 1761  
Examiner: WONG

SIR:

Attached hereto for filing are the following papers:

**Appeal Brief with Appendices I, II, and III (in triplicate)**

Our check in the amount of \$320.00 is attached covering any required fees. In the event any variance exists between the amount enclosed and the Patent Office charges for filing the above-noted documents, including any fees required under 37 C.F.R. 1.136 for any necessary Extension of Time to make the filing of the attached documents timely, please charge or credit the difference to our Deposit Account No. 15-0030. Further, if these papers are not considered timely filed, then a petition is hereby made under 37 C.F.R. 1.136 for the necessary extension of time. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.

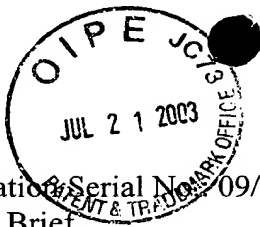
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Application Serial No. 09/923,358  
Appeal Brief

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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF: :  
YOSHIYUKI KUMAZAWA ET AL : EXAMINER: WONG  
SERIAL NO.: 09/923,358 :  
FILED: AUGUST 8, 2001 : GROUP ART UNIT: 1761  
FOR: CHEESE YIELD ENHANCING METHOD

APPEAL BRIEF

COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313

SIR:

This is an appeal from the Final Rejection dated February 24, 2003, of Claims 8-34, all of the claims pending in the application. A Notice of Appeal was filed on May 19, 2003.

I. REAL PARTY OF INTEREST

The real party of interest in this appeal is Ajinomoto Co., Inc. having a place of business at 15-1, Kyobashi 1-chome, Chuo-Ku, Tokyo 104-8315, Japan.

II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative, and the Assignee are aware of no other appeals or interferences which will directly affect or be directly affected by or have a bearing

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on the Board's decisions in this appeal.

### III. STATUS OF THE CLAIMS

Claims 8-34 stand rejected and all are appealed.

### IV. STATUS OF AMENDMENTS

In the Official Action dated November 4, 2002, the Examiner indicated that the Amendment filed on August 21, 2002, had been entered.

### V. SUMMARY OF THE INVENTION

Present Claims 8-21 relate to methods for producing cheese, which comprise:

(1) mixing a partial hydrolysate of milk whey protein with a milk material, to obtain a first mixture;

(2) coagulating said mixture with a milk coagulating enzyme, to obtain a second mixture comprising cheese curd and whey (*see*, page 11, lines 6-16, of the specification).

Present Claims 22-34 relate to methods for producing cheese, which comprise:

(1) mixing a partial hydrolysate of milk whey protein with a milk material, to obtain a first mixture;

(2) treating said first mixture with transglutaminase, to obtain a second mixture; and

(3) coagulating said second mixture with a milk coagulating enzyme, to obtain a mixture comprising cheese curd and whey (*see*, page 11, lines 16-25, of the specification).

The inventors have found that the presently claimed methods afford a surprisingly

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enhanced yield of cheese as compared to conventional methods for preparing cheese.

The cited references contain no disclosure or suggestion of such methods of preparing cheese. Moreover, these references contain no teaching which would suggest the improved yields afforded by the presently claimed methods. Accordingly, these references cannot affect the patentability of the present claims.

## VI. ISSUES

The sole issue in this appeal is:

(A) Whether Claims 8-34 are obvious under 35 U.S.C. §103(a) in view of U.S. Patent No. 6,224,914 (Han et al) in view of J. Dairy Sci., vol. 61, pp. 1233-1237 (1978) (Monti et al).

## VII. GROUPING OF CLAIMS

The claims do not stand or fall together. For the purposes of this Appeal, the claims are grouped as follows:

Group I: Claims 8-21 (see Section VIII, Issue A); and

Group II: Claims 22-34 (see Section VIII, Issue B).

## VIII. ARGUMENT

### Issue A:

The rejection of Claims 8-21 under 35 U.S.C. § 103(a) in view of Han et al in view of Monti et al should be reversed. Han et al discloses a process in which a milk product,

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fortified with whey protein, is first treated with transglutaminase, to effect cross-linking of the whey protein, and then added to another milk product for curding. Thus, what is added to the milk in the process in Han et al is a ***cross-linked product of whey protein***, not a breakdown or decomposition product (partial hydrolysate) of milk whey protein.

In sharp contrast, present Claims 8-21 involve adding a ***partial hydrolysate*** of milk whey protein to a milk material prior to coagulation. As recited in Claims 10-12 and 24-26, the partial hydrolysate of milk whey protein may be prepared by treating whey protein with a protease such as trypsin. Thus, what is added to the milk in the presently claimed methods is a partial breakdown or decomposition product of whey protein.

There is no disclosure of the presently claimed process in Han et al. Moreover, a key step of the presently claimed methods involves treating the whey protein in a way which is just the opposite to the way described in Han et al. Specifically, as explained in more detail below, Han et al only discloses the use of a ***coagulated*** whey protein and is silent in regard to ***partially hydrolyzed*** whey protein.

Appellants submit that there is nothing in Monti et al which can cure the basic deficiencies of Han et al. Moreover, there is likewise no teaching in Monti et al which would suggest adding a partial hydrolysate of milk whey protein to a milk material prior to coagulation.

Monti et al merely discloses that trypsin digestion is effective for the resolubilization of ***heat-denatured*** whey proteins. Moreover, Monti et al is unconcerned with increasing the amount of whey protein into a cheese product. In support of this assertion, Appellants cite the complete publication of Monti et al, a copy of which was submitted, as Exhibit A, with

the Response and Request for Reconsideration filed on April 17, 2003.

On page 2 of the Official Action dated February 24, 2003, the position is taken that it would have been obvious to “use the trypsin as taught by” Monti et al in the process of Han et al, because “the use of trypsin serves to increase the solubility of whey protein and consequently makes it easier to incorporate into a cheese product.” However, this conclusion is not supported by the disclosures of the references.

Quite simply, there is no teaching in either of the cited references which would suggest that partial enzymatic digestion of whey proteins would be useful for increasing the incorporation of whey proteins into a cheese product. In fact, the primary reference, Han et al, suggests just the opposite. As explained above, Han et al discloses that it is by *coagulating* the whey protein that the incorporation in to a cheese product is increased. The coagulation disclosed in Han et al is essentially just the opposite of the partial enzymatic hydrolysis disclosed in Monti et al. Thus, there is nothing in Han et al which would even remotely suggest that enzymatic hydrolysis would be useful for increasing the incorporation of whey protein into a cheese product. As also explained above, Monti et al is unconcerned with enhancing cheese yield. Thus, even the combined teachings of the cited references fail to suggest the presently claimed methods.

In any event, the skilled artisan would not be motivated to combine the disclosures of Han et al and Monti et al, because to do so would destroy the very heart of the primary reference, Han et al. Specifically, Han et al discloses:

The process includes *the significant step* that a dairy liquid fortified with whey protein is contacted with a transglutaminase to provide a modified dairy liquid containing whey protein products.

Abstract, emphasis added.

\* \* \*

This invention relates to a method that allows the incorporation of large amounts of whey protein into cheese. *The method involves the action of a transglutaminase on whey protein to prepare cheese curd incorporating a significant proportion of whey protein.*

Field of the Invention, col. 1, lines 6-10, emphasis added.

\* \* \*

The *principal requirement* of any transglutaminase employed in the instant invention is that it have the *cross-linking activity* discussed above.

Col. 7, lines 18-21, emphasis added.

\* \* \*

The known enzymatic function of transglutaminase is to catalyze the transfer of the  $\gamma$ -carboxamide group of a glutaminyl residue in a protein or peptide to the  $\epsilon$ -amino of a lysyl residue of the same or a different protein or peptide. Without wishing to be bound by theory, if such reactions were to occur involving the whey proteins present in the first dairy liquid, glutaminyl-lysyl side chain-side chain crosslinks would form between the protein components present, including crosslinks among and between the whey proteins (i.e., intra- or inter-molecular cross linking).

Col. 9, lines 11-20.

Thus, the entire point of Han et al is to use a transglutaminase to effect cross-linking of the whey protein to ultimately achieve incorporation of the whey protein into the cheese product. The trypsin partial hydrolysis (bond breaking) of Monti et al is essentially the reverse of the transglutaminase cross-linking (bond making) of Han et al. Thus, the use of trypsin in the method of Han et al would completely destroy the heart of this reference.

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Moreover, there is nothing in the cited references, even in combination, which would suggest any advantage to be obtained by adding a partial hydrolysate of milk whey protein to a milk material prior to coagulation. In fact, it is the surprising discovery of the present inventors that the presently claimed methods for preparing cheese afford dramatic improvements in cheese yield.

In support of the assertion that the presently claimed methods result in dramatic improvements in cheese yield, Appellants cite the results presented in Table 1, on page 27, of the specification. For convenience, the results given in Table 1 are repeated below:

Test solution: milk (whey decomposed material/TG)	Curd dry material weight (g)	lactose in dry curd (g)	Protein increase (g)
(a) Milk (non-added/non-added)	1.0475	0.318	0 (0%)
(b) Milk (non-added/added)	1.0714	0.306	+0.036 (5%)
(c) Milk (added/non-added)	1.2554	0.360	+0.166 (23%)
(d) Milk (added/added)	1.4331	0.506	+0.198 (27%)

Inspection of the results presented in Table 1 shows that addition of the partial hydrolysate of milk whey protein according to the present method, test solutions (c) and (d), affords superior yields as compared to analogous test solutions in which the partial hydrolysate of milk whey protein was not added, test solutions (a) and (b). Appellants submit that there is no teaching in the cited references, even in combination, which would suggest the improved yields for the presently claimed methods, test solutions (c) and (d) in Table 1.

Accordingly, the rejection should be REVERSED.



Issue B:

The rejection of Claims 22-34 under 35 U.S.C. § 103(a) in view of Han et al in view of Monti et al should be reversed. Claim 22, like Claim 8, recites the “(1) mixing a partial hydrolysate of milk whey protein with a milk material, to obtain a first mixture.” Thus, Claim 22 is patentable over the cited references for the all of the reasons discussed above in Section VII, Issue A, and those arguments are incorporated herein by reference.

Claims 22-34 also recite “treating said first mixture with transglutaminase.” Thus, these claims recite the use of transglutaminase in conjunction with a mixture containing a partial hydrolysate of milk whey protein. The inventors have found that such methods provide an even greater enhancement in the yield of cheese.

In support of this assertion, Appellants again cite the data presented in Table 1, on page 27, of the specification, which is again repeated below:

Test solution: milk (whey decomposed material/TG)	Curd dry material weight (g)	lactose in dry curd (g)	Protein increase (g)
(a) Milk (non-added/non-added)	1.0475	0.318	0 (0%)
(b) Milk (non-added/added)	1.0714	0.306	+0.036 (5%)
(c) Milk (added/non-added)	1.2554	0.360	+0.166 (23%)
(d) Milk (added/added)	1.4331	0.506	+0.198 (27%)

As shown in the table given above, the use of transglutaminase affords an increase in the yield of cheese of 5% (compare test solutions (a) and (b)). However, the use of transglutaminase in conjunction with a partial hydrolysate of milk whey protein gives a 27%

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increase in the cheese yield (compare test solutions (a) and (d)). Once again, there is nothing in the cited references which would suggest this improved yield.

Accordingly, the rejection should be REVERSED.

Appellants respectfully submits that the application is now in condition for allowance, and that all of the rejection should be REVERSED.

Respectfully submitted,  
OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.

A handwritten signature in black ink, appearing to read 'Stephen G. Baxter', written in a cursive style.

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